

Pressure Reducing Valve

Type 2114/2415



Fig. 1 · Type 2114/2415

1. Design and principle of operation

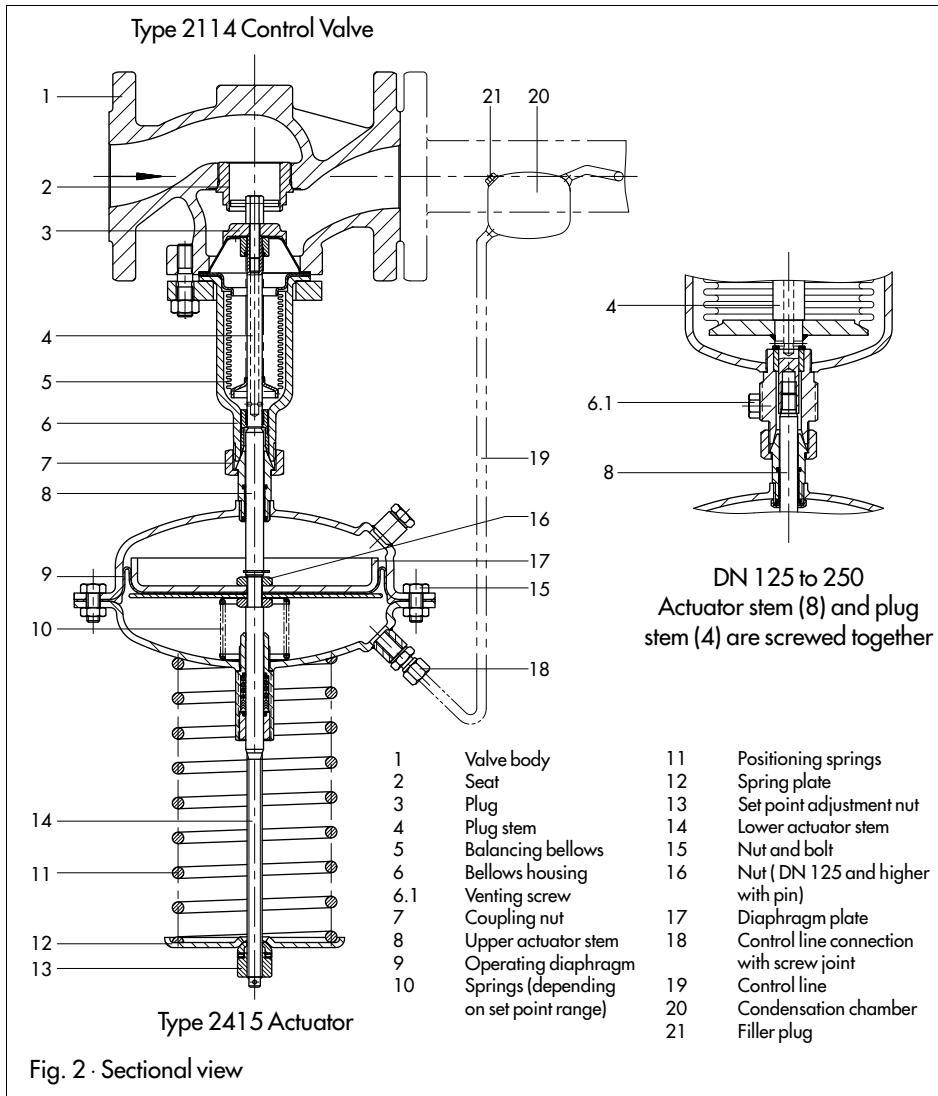
The Type 2114/2415 Pressure Reducing Valve consists of the Type 2114 Valve and the Type 2415 Actuator.

The pressure reducing valve is designed to maintain the pressure downstream of the valve to an adjusted set point value. The valve closes when the downstream pressure rises.

The medium to be controlled flows through the free area between the seat (2) and the plug (3) in the direction indicated by the arrow. The position of the valve plug determines the flow rate and hence the pressure ratio across the valve.

The downstream pressure is transferred via the control line (19) to the operating diaphragm (9) where it is converted into a positioning force. This force is used to position the

valve plug according to the force of the positioning springs (11). The spring force can be adjusted at the set point adjustment nut (13). The control valves have a balancing bellows (5). The downstream pressure acts on the inner bellows surface, while the upstream pressure acts on the outer surface. Thus the forces produced by the upstream and downstream pressures, acting on the plug, are balanced.



2. Installation

2.1 Assembly

The valve and actuator can be assembled together prior to or after the control valve has been installed in the pipeline.

Release the tension of the positioning springs by turning the set point adjustment nut and attach the actuator to the bellows housing (6) with the coupling nut (7).

Attention for valve sizes DN 125 to 250, the diaphragm stem and plug stem must be screwed together!

When the control valve and the actuator are assembled together later, it is important to check first whether the versions fit:

The control valve must have a tapped hole at the end of the plug stem.

Valve versions intended for the attachment of a thermostat (Type 4 Temperature Regulator) have a threaded nipple screwed in the end of the plug stem - this nipple must be removed!

The actuator must have a threaded diaphragm stem! Versions without this threaded stem cannot be used.

Release the tension of the positioning springs of the actuator by turning the set point adjustment nut (13). Place the actuator under the valve bonnet and carefully screw it on as tight as possible and then unscrew it one turn at the maximum.

Hold the actuator and screw on tight the coupling nut.

2.2 Installation position

The pressure reducing valve must be installed in a horizontal pipeline and with the actuator suspended downwards. The medium must flow through the valve in the direction indicated by the arrow on the valve body.

When selecting the installation location, ensure that the regulator remains easily accessible after the plant has been installed.

Make sure that the regulator is installed in the pipeline free of stress. If necessary, support the piping near the valve flanges.

Do not mount any supports on the valve or on the actuator.

When used with a medium which condenses, for example, steam, the pipeline should be laid both sides of the valve with a slight downward slope in order to allow any condensation forming to drain off. If the pipeline upstream and downstream of the valve is laid vertically, always install a steam trap (Samson Type 13 E Steam Trap).

Never install any devices between the pressure tap point and the control valve which restrict the piping's cross-section (e.g. a temperature regulator or shut-off valves).

If a bypass pipe is to be equipped, it must be connected downstream of the pressure tap point. A shut-off valve must be installed in the bypass pipe.

Before installing the regulator, flush out thoroughly the pipeline, in order to ensure that any sealing parts, globules and other impurities carried along by the medium cannot impair the proper functioning of the valve, especially the tight shut-off. Always install a strainer (Samson Type 2) upstream of the pressure reducing valve (see section 2.4).

2.3 Control line, condensation chamber and screw joint with throttle

A control line (to be provided by the customer) using a 3/8" pipe must be installed. If a copper pipe is to be used, a 12 x 1 mm pipe is recommended.

A condensation chamber is necessary for liquids above 150 °C and for steam.

If the regulator has a tendency to hunt, the installation of a needle valve in the control line is recommended.

Connect the control line at least 1 metre away from the valve outlet to the downstream pressure line (Fig. 3.1).

If a manifold is installed downstream of the pressure reducing valve (Fig. 3.2), the control line must be connected to the manifold even if this is located several metres away.

If the downstream pressure line behind the valve is extended with a conical expansion piece, the control line must be connected at the extended part of the pipeline. Weld the

control line onto the side of the pipeline and in the middle and with an approx. 1:10 slope up towards the condensation chamber.

The installation position of the condensation chamber is labelled and marked with an arrow and the word "Top" on the top of the tank. It is essential to keep to this installation position otherwise the reliable operation of the pressure reducing valve cannot be guaranteed.

Weld the control line from the pressure tap point to the 3/8" pipe socket on the condensation chamber. Always position the condensation chamber at the highest point of the pipeline, i.e. the control line between the condensation chamber and the actuator must be run with a downward slope. In this case, use a 3/8" pipe with screw glands.

If the control line is connected below the cen-

ter of the valve outlet flange, the condensation chamber must be positioned at the same level as the outlet flange (Fig. 3.3). In this case, a 1/2" pipe at the minimum must be used for the control line from the pressure tap point.

When the control line is connected above the center of the valve outlet flange, the condensation chamber must be positioned at the same height as the downstream pressure tap point (Fig. 3.4). The additional pressure of the condensate head must be compensated for by adjusting the set point to a higher value.

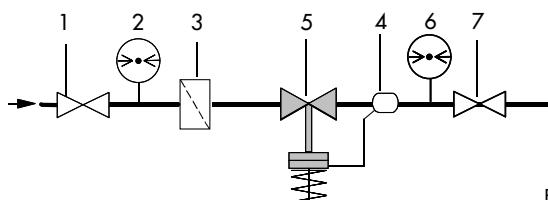


Fig. 3.1 · Control line connection (pipeline)

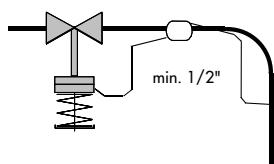


Fig. 3.3 · Connection below the center of flange

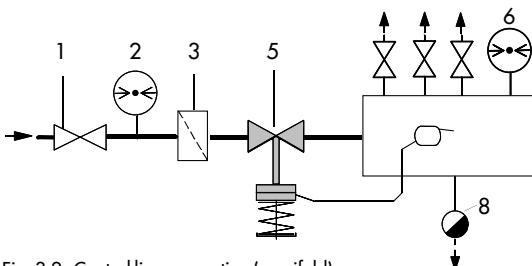


Fig. 3.2 · Control line connection (manifold)

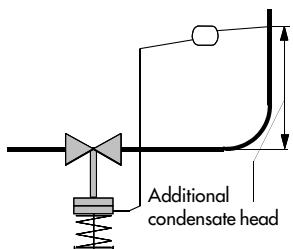


Fig. 3.4 · Connection above the center of flange

Fig. 3 · Installation examples

| | |
|---------------------------|-----------------------------|
| 1 Shut-off valve | 5 Pressure reducing valve |
| 2 Upstream pressure gauge | 6 Downstream pressure gauge |
| 3 Strainer | 7 Shut-off valve |
| 4 Condensation chamber | 8 Steam trap |

2.4 Strainer

Install the strainer upstream of the pressure reducing valve. The medium must flow through the valve in the direction indicated by the arrow on the strainer body. The strainer filter must hang downwards. Make sure that sufficient space is available to remove the filter.

2.5 Shut-off valves

We recommend the installation of hand-operated shut-off valves both upstream of the strainer and downstream of the valve. This allows the plant to be isolated for cleaning and maintenance purposes or when left unused for extended periods.

2.6 Pressure gauge

Install a pressure gauge both upstream and downstream of the regulator in order to be able to observe the pressures prevailing in the plant. Do not install the pressure gauge on the downstream pressure side in front of the downstream pressure tap point.

3. Operation

3.1 Start-up

When controlling steam:

Unscrew the filling plug (21) on the condensation chamber and fill it up with water using the plastic funnel included or a can until the water starts to overflow.

Screw tight the filling plug. The pressure reducing valve is now ready for use. Open the hand-operated shut-off valves slowly in order to prevent any condensation hammering.

When controlling liquids:

Take the pressure reducing valve into operation by slowly opening the hand-operated shut-off valves. For actuators with a diaphragm area of 640 cm^2 , loosen the vent screw until all the air has escaped and then retighten. For temperatures above 150°C , first fill the condensation chamber with the medium to be used.

3.2 Set point adjustment

Adjust the downstream pressure required by turning the set point adjustment nut (13). Turn it clockwise to increase the downstream pressure and anti-clockwise to reduce the pressure. The set point adjusted can be checked by reading the downstream pressure gauge.

4. Faults

If the downstream pressure (see the pressure gauge downstream of the valve) deviates considerably from the set point adjusted, first check the control line for blockages and the operating diaphragm for leaks.

When faults occur due to other reasons, such as a damaged seat and plug, we recommend you to contact our after-sales service or to return the valve to the manufacturer for repair. If the operating diaphragm is damaged, see section 4.1.



When performing any assembly work on the pressure reducing valve, first remove the valve from the pipeline. Before doing so, always relieve the pressure from the corresponding part of the plant and drain it, if necessary.

4.1 Exchanging the operating diaphragm

Should just the operating diaphragm be damaged, after draining the part of the plant concerned, unscrew the control line. The actuator can be disassembled from the valve without having to remove the whole regulator from the pipeline. However, in this case it is important to make sure that the actuator cone seals the control valve and the medium runs out of the valve when the actuator is being removed.

Unscrew the bolts (15) on the actuator and remove the lower diaphragm case with the diaphragm stem (14) and the spring assembly.

Unthread the nut (16) while holding the lower

diaphragm stem with an appropriate tool (in valve sizes DN 125 and above, the upper diaphragm stem is secured with a pin which must be first knocked out), lift off the dia-

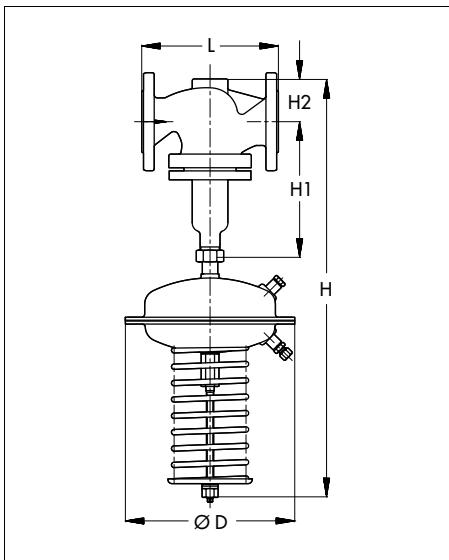
phragm plate (17) and remove the dia-phragm. Insert new diaphragm.

To reassemble, proceed in the reverse order.

To put back into operation, see section 3.1.

5. Dimensions in mm and weights

| DN | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 | 250 | | | | | | |
|-----------------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|--|--|
| L | 130 | 150 | 160 | 180 | 200 | 230 | 290 | 310 | 350 | 400 | 480 | 600 | 730 | | | | | | |
| H1 | 225 | | | | | | 460 | | | | | | 590 | | | | | | |
| H2 | 55 | | | | | | 100 | | | | | | 120 | | | | | | |
| H | cm ² | ØD | | | | | | | | | | | | | | | | | |
| | 40 | 170 | | | | | | | | | | | | | | | | | |
| | 80 | 170 | | | | | | | | | | | | | | | | | |
| | 160 | 225 | | | | | | | | | | | | | | | | | |
| | 320 | 285 | | | | | | | | | | | | | | | | | |
| | 640 | 320 | | | | | | | | | | | | | | | | | |
| Weight, in approx. kg | | | | | | | | | | | | | | | | | | | |
| cm ² | 40/80 | 11 | 12 | 13 | 19 | 20 | 22 | 33 | 38 | 52 | 116 | 166 | 406 | | | | | | |
| | 160 | 16 | 17 | 18 | 24 | 25 | 27 | 38 | 43 | 57 | 121 | 171 | 411 | | | | | | |
| | 320 | 20 | 21 | 22 | 28 | 29 | 31 | 42 | 47 | 61 | 125 | 175 | 415 | | | | | | |
| | 640 | 30 | 31 | 32 | 38 | 39 | 41 | 52 | 57 | 71 | 135 | 185 | 425 | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |



6. Customer inquiries

Should you have any inquiries about the valve, please submit the following details:

1. Type and nominal size of the pressure reducing valve
2. Product and order number (indicated on the name plate)
3. Upstream and downstream pressure
4. Flow rate in m³/h
5. Has a strainer been installed ?
6. Installation drawing



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